Claims

1. A method for determining the authenticity of an item such as a security document, a valued good or a packaging, the item carrying a marking exhibiting a viewing-angle dependent light reflection spectrum, the method comprising the steps of
   a) illuminating said marking with at least a first light source having first spectral characteristics;
   b) collecting light reflected by said marking at least at two predefined different observation angles with respect to the plane of the marking, and measuring its respective intensity;
   c) optionally storing the measured intensity values of step b) in a permanent digital memory;
   d) illuminating said marking with at least a second light source having second spectral characteristics;
   e) collecting light reflected by said marking at least at two predefined different observation angles with respect to the plane of the marking, and measuring its respective intensity;
   f) optionally storing the measured intensity values of step e) in a permanent digital memory;
   g) comparing said measured intensity values of steps b) and e) with previously stored corresponding reference values according to a predefined algorithm, and deriving a authenticity indicator from the comparison result using a pre-established decision criterion;

   characterized in that the illumination of steps a) and d) is a wide-angle illumination.

2. Method according to claim 1, characterized in that said wide-angle illuminating of the marking is provided through a 'non-

imaging-optics' device, preferably a Compound Parabolic Concentrator (CPC).

3. Method according to one or more of claims 1 to 2, characterized in that a first of said at least two predefined observation angles is chosen between 0° and 45°, more preferably between 0° and 35°, and a second of said observation angles is chosen between 45° and 90°, more preferably between 50° and 80°, with respect to normal to the plane of the marking.

4. Method according to one or more of claims 1 to 3, characterized in that said light reflected by said marking at said observation angles is collected by the means of optical fibers.

5. Method according to one or more of claims 1 to 4, characterized in that the intensity of said light reflected by said marking at said observation angles is measured after passage of said light through an optical filter.

6. Method according to claim 5, characterized in that said optical filter is a left- or a right-handed circular polarization filter.

7. Method according to one or more of claims 1 to 6, characterized in that at least one of said illuminations having different spectral characteristics is provided by a light-emitting diode (LED).

8. Method according to one or more of claims 1 to 7, characterized in that at least one of said illuminations

having different spectral characteristics is provided by laser diode (LD).

9. Method according to one or more of claims 1 to 8, characterized in that at least one of said illuminations having different spectral characteristics is provided by a light source equipped with an optical filter.

10. Method according to one or more of claims 1 to 9, characterized in that a prompt or delayed photoluminescence emission from said marking, in the UV-, the visible-, or the IR-range of the electromagnetic spectrum, is measured in addition to said viewing-angle dependent light reflection spectrum.

11. Method according to one or more of claims 1 to 10, characterized in that a magnetic property of the marking is measured in addition to said viewing-angle dependent light reflection spectrum.

12. Method according to one or more of claims 1 to 11, characterized in that said measured values and said previously stored corresponding reference values are obtained using the same physical device.

13. Device for determining the authenticity of an item such as a security document, a valued good or a packaging, carrying a marking exhibiting a viewing-angle dependent light reflection spectrum; said device comprising

- at least two light sources having different spectral characteristics for providing sequential illumination to said marking;

- at least two photodetectors with optional collection optics for collecting light reflected by said marking at least at two predefined, different observation angles and delivering an electric signal corresponding to the collected light intensity;
- analog-to-digital converting, processing, controlling and memory means, for controlling the light sources, digitizing and storing reflected intensity values, for comparing said intensity values with previously stored corresponding reference values, and for deriving an authenticity indicator from the comparison result, all according to a predefined algorithm and using a pre-established decision criterion;

characterized in that the device comprises a wide-angle illumination optics for guiding the light of said light sources to said marking.

14. Device according to claim 13, wherein said wide-angle illumination optics is a 'non-imaging-optics' device, preferably a Compound Parabolic Concentrator (CPC).

15. Device according to one or more of claims 13 to 14, characterized in that a first of said at least two predefined observation angles is chosen between 0° and 45°, more preferably between 0° and 35°, and a second of said observation angles is chosen between 45° and 90°, more preferably between 50° and 80°, with respect to normal to the plane of the marking.

16. Device according to one or more of claims 13 to 15, characterized in that it comprises at least one optical fiber for collecting said light reflected by said marking at said observation angles.

17. Device according to one or more of claims 13 to 16, characterized in that it comprises at least one optical filter through which said light reflected by said marking at said observation angles is measured.

18. Device according to claim 17, characterized in that said optical filter is a left- or a right-handed circular polarization filter.

19. Device according to one or more of claims 13 to 18, characterized in that at least one of said light sources is a light-emitting diode (LED).

20. Device according to one or more of claims 13 to 19, characterized in that at least one of said light sources is a laser diode (LD).

21. Device according to one or more of claims 13 to 20, characterized in that at least one of said light sources is equipped with an optical filter.

22. Device according to one or more of claims 13 to 21, characterized in that it supports a programmed 'learning mode' for determining reflected intensity values on a reference item and storing them as reference values in a digital memory, and a programmed 'testing mode' for determining reflected intensity values on an item to be authenticated and comparing them with said previously determined and stored reference values, hereby deriving said authenticity indicator.